

PATENT ABSTRACTS OF JAPAN

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(54) DEVICE AND METHOD FOR PROCESSING INFORMATION, STORAGE
MEDIUM AND COMMUNICATION SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To easily recognize what kind of video images are present in a photographable range by photographing the video images of plural screens, corresponding to the instruction of requesting wide visual field video images and generating, transmitting and displaying the wide visual field video images.

SOLUTION: A pseudo-panoramic image window 3-1 displays pseudo-panoramic images, reduces an image size from an actual images or performs display by a low resolution, so as to be matched with the display ability of a display and displays the screen at a level capable of making a user able to recognize the conditions. A video window 3-2 displays the video images photographed by a camera server, based on camera control from a camera client device in real time. A camera control window 3-3 specifies camera control parameters required for the operations of panning, tilting and zooming, etc., so as to perform the camera control. A photographable range fetching button 304 requests the pseudo-panoramic images, and when it is clicked with a mouse or the like, a processing for fetching the pseudo-panoramic images is started.

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CLAIMS

[Claim(s)]

[Claim 1] It is the communication system which receives the image from a sending set and this sending set which transmits the image photoed from the image pick-up means through a communication line, and consists of receiving sets to display. Said receiving set It has a directions means to transmit the directions which require a wide-field-of-view image to said sending set, and a display-control means to display on a predetermined display means the wide-field-of-view image transmitted by this sending set. Said sending set Communication system characterized by having a transmitting means to make said image pick-up means photo the image of two or more screens according to directions of said directions means, to generate said wide-field-of-view image using the image of obtained two or more screens, and to transmit this wide-field-of-view image to said receiving set.

[Claim 2] Said wide-field-of-view image is communication system according to claim 1 characterized by being all the images of the range of said image pick-up means which can be photoed.

[Claim 3] Generation of said wide-field-of-view image is communication system according to claim 1 characterized by inputting the image of two or more screens and compounding the image of these two or more screens by carrying out fixed include-angle change of whenever [pan / of said image pick-up means /, and tilt angle].

[Claim 4] Generation of said wide-field-of-view image is the pan of said image pick-up means, and communication system according to claim 1 characterized by compounding the image of said two or more screens based on positional information including whenever [tilt angle].

[Claim 5] It is the communication system which receives the image from a sending set and this sending set which transmits the image photoed from the image pick-up means through a communication line, and consists of receiving sets to display. Said receiving set Said wide-field-of-view image is generated using the image of a directions means to transmit the directions which require a wide-field-of-view image to said sending set, and two or more screens transmitted by this sending set. It is the communication system characterized by having a transmitting means to transmit the image of two or more screens which have a display-control means to display this wide-field-of-view image on a predetermined display means, and said sending set made said image pick-up means photo the image of two or more screens according to directions of said

directions means, and were obtained to said receiving set.

[Claim 6] It is the communication system according to claim 1 or 5 which said receiving set has said predetermined display means inside, has an assignment means to specify a part of wide-field-of-view image displayed on the display means further predetermined [this], and is characterized by said receiving set transmitting the command for specifying photographic coverage as said sending set based on the location of this assignment to said sending set.

[Claim 7] The information processor which it has in a transmitting means transmit said wide-field-of-view image which generated using the image of two or more screens which said image pick-up means photoed according to an input means input the image the predetermined image pick-up means was made an image to photo, a transmitting means transmit the image which inputted with this input means to the communications-partner point, a receiving means receive the directions which require a wide-field-of-view image, and reception of these directions to said communications-partner point.

[Claim 8] The information-processing approach which it has in the transmitting step which transmits said wide-field-of-view image which generated using the image of two or more screens which said image pick-up means photoed according to the input step which inputs the image a predetermined image pick-up means made an image photo, the transmitting step which transmit the

image which inputted at this input step to the communications-partner point, the receiving step which receive the directions which require a wide-field-of-view image, and reception of these directions to said communications-partner point.

[Claim 9] The input step which inputs the image which the predetermined image pick-up means was made to photo, and the transmitting step which transmits the image inputted at this input step to the communications-partner point, The receiving step which receives the directions which require a wide-field-of-view image, The storage which memorized from the computer the program which performs the transmitting step which transmits said wide-field-of-view image generated using the image of two or more screens which said image pick-up means photoed according to reception of these directions to said communications-partner point in the condition which can be read.

[Claim 10] A wide-field-of-view image demand means to be the possible information processor of controlling the image pick-up means of the communications-partner point connected through the communication line, and to transmit the directions which require a wide-field-of-view image to said communications-partner point, The information processor characterized by having a receiving means to receive said wide-field-of-view image generated using the image of two or more screens which said image pick-up means was made to take a photograph, and were obtained, and the control means which

displays on a predetermined display means the wide-field-of-view image which this receiving means received.

[Claim 11] It is the information processor according to claim 10 which said information processor has said predetermined display means inside, has an assignment means to specify a part of wide-field-of-view image displayed on the display means further predetermined [this], and is characterized by said information processor transmitting the command for specifying photographic coverage as said sending set based on the location of this assignment to said sending set.

[Claim 12] The wide-field-of-view image demand step which is the information processing approach which controls the image pick-up means of the communications-partner point connected through the communication line, and transmits the directions which require a wide-field-of-view image to said communications-partner point, The information processing approach characterized by having the receiving step which receives said wide-field-of-view image generated using the image of two or more screens which said image pick-up means was made to take a photograph, and were obtained, and the control step which displays on a predetermined display means the wide-field-of-view image received at this receiving step.

[Claim 13] It is the storage which memorized the program which makes the

image pick-up means of the communications-partner point connected through the communication line control by computer in the condition which can be read. The wide-field-of-view image demand step which transmits the directions which require a wide-field-of-view image to said communications-partner point, The receiving step which receives said wide-field-of-view image generated using the image of two or more screens which said image pick-up means was made to take a photograph, and were obtained, The storage which memorized the program which performs the control step which displays on a predetermined display means the wide-field-of-view image received at this receiving step by computer in the condition which can be read.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the technique of transmitting the image which photoed the image with the image pick-up means through a communication line.

[0002]

[Description of the Prior Art] It not only can display the camera image of a remote place, but it receives the image of a video camera from a remote place, and what can specify camera-control parameters, such as a zoom scale factor, is known whenever [paninclude-angle / of the video camera of a remote place /, and tilt angle] in the system which can be displayed.

[0003] For example, the camera in which computer control is possible is connected to the server (KAMERASA-BA) terminal of WWW on the Internet (World Wide Web), the real-time image photoed from the camera can be transmitted to the terminal (side which receives an image) of the user who accessed the above-mentioned server terminal, and there is image communication system which can control the above-mentioned camera from a user's terminal further.

[0004] In such image communication system, as a means to input a control signal for a user to control a camera, whenever [paninclude-angle and tilt angle], a camera-control parameter called a zoom scale factor is specified as a direct numeric value from input devices, such as a keyboard, or the method of adjusting a carbon button and a scroll bar and specifying a camera-control parameter by software is learned.

[0005] Moreover, the map image and wide-field-of-view image which were beforehand prepared by the KAMERASA-BA side are displayed on a user's

terminal side, and the method of specifying a camera-control parameter from that of a user specifying the coordinate location on the image is also learned.

[0006]

[Problem(s) to be Solved by the Invention] However, there was a problem that it was difficult to grasp what kind of image there is a problem of taking time amount to display the image reflected in the camera-control parameter which the user inputted on a user's terminal in the conventional approach if the transmission speed for transmitting a control signal and a video signal is slow or processing of a server terminal and a user's terminal is slow, and is in current and the range which can be photoed.

[0007] It aims at enabling it to grasp easily what kind of image this invention is accomplished in view of the above-mentioned conventional example, and is in current and the range which can be photoed.

[0008]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, according to the communication system of this invention, the image from a sending set and this sending set which transmits the image photoed from the image pick-up means is received through a communication line. A directions means of said receiving set to transmit the directions which are the communication system which consists of receiving sets to display, and require a

wide-field-of-view image to said sending set, A transmitting means of said sending set to make said image pick-up means photo the image of two or more screens according to these directions, to generate said wide-field-of-view image using the image of obtained two or more screens, and to transmit this wide-field-of-view image to said receiving set, It is characterized by having a display-control means of said receiving set to display on a predetermined display means the wide-field-of-view image transmitted by this transmitting means.

[0009]

[Embodiment of the Invention]

(Gestalt of the 1st operation) Drawing 1 is general drawing of the gestalt of operation of this invention explained below.

[0010] The system of this drawing consists of KAMERASA-BA equipment of 1-1, and camera client equipment of 1-2. KAMERASA-BA equipment 1-1 incorporates a taking-from video camera 1-12-a photograph image, and delivers this image to the client equipment then connected. Through a current network, camera server equipment 1-1 and the camera client equipment 1-2 which is one of the equipment connected receive the image sent from camera server equipment 1-1, and displays it on a bit mapped display 1-23. In addition, although [the gestalt of this operation] camera client equipment 1-2a of others which were equipped with the same function as camera client equipment 1-2 to

one KAMERASA-BA equipment 1-1, 1-2b, etc. are connected, only detailed explanation about camera client equipment 1-2 is given.

[0011] KAMERASA-BA equipment 1-1 consists of secondary storage 1-14 for saving the video capture equipment 1-13 which incorporates the image from the video camera 1-12 for inputting an image as a digital signal, and a video camera, network I/F 1-16 which transmits the incorporated image on a network 1-3, CPU 1-11 which controls actuation of the one to camera server equipment 1 whole and memory 1-15, and access information.

[0012] Video capture equipment 1-13 incorporates the NTSC signal of the image photoed from the video camera 1-12, and after A/D conversion, it is compressed by MotionJPEG and it sends it to network I/F 1-16. Although the compression method of an image was set to MotionJPEG with the gestalt of this operation, not only this but a lossless compression method may be used. In addition, about the frame rate of an image, it considers as a capture and the thing to deliver at the rate of the range which rates, such as a network and CPU, and the incorporation rate of a camera allow.

[0013] Camera client equipment 1-2 receives the image data transmitted through a network 1-3 from KAMERASA-BA equipment 1-1 through network I/F 1-27, elongates the image data compressed by CPU 1-21, and displays them on a bit mapped display 1-23.

[0014] The operation system of a window type shall operate, for example, and it shall express on a display 1-23 as camera client equipment 1-2. Camera client equipment 1-2 has a mouse for inputting the secondary storage 1-25 for memorizing the memory 1-24 and image data for assisting the operation of CPU 1-21, and the control command of a camera, and an input unit 1-26 like a keyboard.

[0015] Drawing 3 is an actuation screen displayed on a bit mapped display 1-23. On a bit mapped display 1-23, the operation system in which two or more window displays are possible shall operate.

[0016] 3-1 is a false panorama image window which displays a false panorama image, and is displayed on the bit mapped display 1-23. The false panorama image 3-1 displays the image of extent with which image size can contract, or it displays with a low resolution, and a user can grasp a situation rather than a actual image, in order to double with the display capacity of a display.

[0017] 3-2 is an image window which gives a real-time indication of the image which the camera server was made to photo based on the camera control from current and camera client equipment 1-2. Moreover, 3-3 is a camera-control window for specifying a camera-control parameter required for actuation, such as a pan, a tilt, and a zoom, in order to perform camera control. 3-4 is a carbon button for requiring a false panorama image, and if this carbon button is clicked

with a mouse etc., it will start the processing which captures a false panorama image.

[0018] Drawing 8 is the process block diagram of the gestalt of this operation. A process means the process of multitasking OS, such as UNIX, here. On KAMERASA-BA equipment 1-1, the image photoed from the video camera 1-12 is changed into image data, such as MotionJPEG, using video capture 1-13, and the image transmitting server 8-1 and the camera-control server 8-2 for transmitting to camera client equipment serially are working. In addition, static-image data transmitted by the image transmitting server 8-1, such as not only image data but GIF and JPEG, are sufficient.

[0019] On camera client equipment 1-2, the graphic display process 8-3 for receiving image data or still picture data from KAMERASA-BA equipment serially, and displaying an image and the camera-control process 8-4 for operating a video camera 1-12 are operating.

[0020] Drawing 6 and drawing 7 are drawings showing the flow of processing of the camera-control server 8-2 in KAMERASA-BA equipment 1-1. Actuation of KAMERASA-BA equipment 1-1 is explained using drawing 6 and drawing 7 .

[0021] First, it waits for reception of the camera-control command from camera client equipment 1-2 in step S602. If a camera-control command is received, the content of the command will be distinguished by S603 and S604, and it

progresses to Processings D and E according to a distinction result. After finishing the flow of Processings D and E, it returns to S602 which is the step of the waiting for a command again.

[0022] In S603, when the command from camera client equipment 1-2 is what requires a false panorama image, processing below D of drawing 7 is performed.

[0023] According to the range which can be photoed, i.e., the range which can operate a video camera 1-12, whenever [pan / of a camera / and tilt angle] is changed for every fixed include angle, and the static image for every tilt and paninclude angle is made to photo continuously to a video camera 1-12 in S701.

[0024] In order to photo a large area as much as possible at this time, a zoom scale factor is set as the minimum value. For example, the tilt controllable range of a camera controls the universal head of a video camera 1-12 to whenever [paninclude-angle / when -20 - 20 degrees and the pancontrollable range are -50 - 50 degrees, as they show to drawing 10 / and tilt angle], and photos a static image in each camera-control location.

[0025] Since the positional information which shows whenever [paninclude-angle / at the time of this image photography / and tilt angle] is used when creating a false panorama image later, it is temporarily memorized in memory etc.

[0026] Next, at step S702, KAMERASA-BA equipment 1-1 is connected as the

static image 2-1 of two or more sheets obtained by processing of the above S701 is shown in drawing 2 based on the positional information memorized in memory etc., and it creates the false panorama image 2-2.

[0027] And in S703, KAMERASA-BA 1-1 returns to the command state S602 of drawing 6 , after transmitting the false panorama image 2-2 to the camera client 1-2 via a network.

[0028] In S604 of drawing 6 , when KAMERASA-BA equipment 1-1 receives a camera-control parameter, it progresses to S704 of drawing 7 , and camera-control parameters, such as a pan, a tilt, and a zoom, are acquired from camera client equipment 1-2, and after controlling actuation of a video camera 1-12 according to this camera-control parameter, in S705, it returns to the command state S602 of drawing 6 .

[0029] Drawing 4 and drawing 5 are flow chart drawings showing the flow of processing of the camera-control process 8-4 in camera client equipment 1-2, and are explained to a detail below.

[0030] It waits for the instruction of the mouse actuation from a user etc. at step S402. When there is an instruction from a user, processing is advanced to S403, when actuation of a user clicks the false panorama image demand carbon button 3-4, it progresses to processing of A in drawing 5 , otherwise, processing is advanced after step S404.

[0031] When it progresses to processing of A of drawing 5 , in S501, the command which requires a false panorama image is generated first, and it transmits to KAMERASA-BA equipment 1-1. Next, in S502, the data of a false panorama image are received from KAMERASA-BA equipment 1-1. And in S503, after displaying a false panorama image on a bit mapped display 1-23, it returns to the condition of the waiting for the event of S402.

[0032] Next, at step S404, when a user clicks the false panorama image window 3-1 top, it progresses to processing of B in drawing 5 , otherwise, processing is advanced to S405.

[0033] When it progresses to processing of B of drawing 5 , whenever [coordinate / on the false panorama image clicked in S504 / , and corresponding pan and tilt angle] is first calculated as a camera-control parameter, and it generates. Next, in S505, after transmitting the generated camera-control parameter to KAMERASA-BA equipment 1-1, it returns to the condition of the waiting for the event of S402.

[0034] Next, at step S405, if the user operated the camera-control window 3-3, it will progress to processing of C in drawing 5 , otherwise, will return to the condition of the waiting for the event of S402.

[0035] When it progresses to processing of C of drawing 5 , first, in S506, whenever [pan / corresponding to the control panel of the camera-control

window which the user operated /, and tilt angle] is calculated as a camera-control parameter, and it generates. In S507, after transmitting the calculated camera-control parameter to KAMERASA-BA equipment 1-1, it returns to the condition of the waiting for the event of S402.

[0036] If the above processings are performed on KAMERASA-BA equipment 1-1 and camera client equipment 1-2, whenever the user who operates camera client equipment clicks the carbon button 3-4 for requiring a false panorama image with a mouse etc., the false panorama image 3-1 can update him in the newest condition.

[0037] Moreover, only by choosing and clicking the part on the false panorama image 3-1, the camera-control parameter for acquiring the image of the part is generated automatically, and it can transmit to KAMERASA-BA equipment 1-1 automatically. And it is possible to perform setting out of whenever [fine pan and tilt angle], and a zoom scale factor through the control panel of the camera-control window 3-3.

[0038] Since the false panorama image 2-2 is a static-image signal, it can transmit to a high speed and the processing time required to express this false panorama image 2-2 as camera client equipment 1-2 can also be managed in a short time rather than it transmits a dynamic-image signal via a network continuously. Therefore, the user who operates camera client equipment

becomes possible [the thing which is the need and which is grasped quickly by the way] about the range which can photo a video camera 1-12, and can control a video camera by operating the false panorama image window 3-1 and the camera-control window 3-3 for an include angle and a scale factor to see promptly and simply.

[0039] (Gestalt of the 2nd operation) Although KAMERASA-BA 1-1 connects two or more static-image groups photoed with the video camera 1-12 and compounded the false panorama image with the gestalt of the 1st operation, the camera-control parameter at the time of a static-image group and photography is transmitted to a camera client as it is, and you may make it compound a false panorama image by the camera client side.

[0040] In processing of the camera-control server of KAMERASA-BA equipment, S702 of drawing 7 is not processed but, specifically, processing by S703 is changed into transmitting processing of a static-image group and the positional information of each static image. And in the camera-control process of camera client equipment, processing of S502 is changed into the reception of a static-image group, and before progressing to S503, the step of the false panorama image creation which performs the same processing as S702 is added. By making the above change, the load of information processing by the side of KAMERASA-BA equipment 1-1 is mitigable.

[0041] (Gestalt of the 3rd operation) Drawing 9 is drawing explaining the gestalt of the 3rd operation. The hardware configuration of camera client equipment 9-1, KAMERASA-BA equipment A9 -4, KAMERASA-BA equipment B9-5, and KAMERASA-BA equipment C 9-6 presupposes that it is the same as that of what is shown in drawing 1 of the gestalt of the 1st operation here.

[0042] The user of camera client equipment 9-1 registers some in it (for example, KAMERASA-BA equipment A9 -4, B9-5, C 9-6) into KAMERASA-BARISUTO shown by 9-3, when the network address of two or more KAMERASA-BA equipments is already known.

[0043] This KAMERASA-BARISUTO 9-3 The memory of camera client equipment 9-1, Or it memorizes to the secondary storage. Two or more KAMERASA-BA equipments indicated by KAMERASA-BARISUTO 9-3 when the user clicked the carbon button (carbon button shown all over [9-8] drawing) for requiring the false panorama image to two or more KAMERASA-BA displayed on the bit mapped display of 9-2 False panorama image data is received from each KAMERASA-BA equipment by the approach which required and mentioned the false panorama image above to each of (A9 -4, B9-5, C 9-6), and it displays on the bit mapped display of camera client equipment 9-1.

[0044] When displaying two or more false panorama images on a bit mapped display simultaneously, in order to double with the display capacity of a display,

the false panorama image which is extent which a user can recognize can be displayed by reducing image size or displaying with a low resolution rather than a actual image.

[0045] Thus, when camera client equipment has the function in which a false panorama image can be required from two or more KAMERASA-BA equipments, a user can grasp the photographic coverage (image which can be photoed) of the camera server equipment installed in two or more locations in a short time.

[0046] In addition, it cannot be overemphasized that the various storages stored possible [a computer to read-out of the program code for operating various kinds of devices so that the function of the gestalt of operation mentioned above may be realized] are also contained under the category of this invention.

[0047]

[Effect of the Invention] As explained above, according to this invention, a user is enabled to get to know easily and immediately the range of picture input devices, such as a video camera, which can be picturized, and a desired camera location can be recognized promptly.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] General drawing of the communication system in the gestalt of this operation

[Drawing 2] Drawing explaining how to generate a false panorama image

[Drawing 3] The example of a display of the display of camera client equipment

[Drawing 4] The flow chart which shows processing of camera client equipment

[Drawing 5] The flow chart which shows processing of camera client equipment

[Drawing 6] The flow chart which shows processing of KAMERASA-BA equipment

[Drawing 7] The flow chart which shows processing of KAMERASA-BA equipment

[Drawing 8] The process conceptual diagram of the whole communication system

[Drawing 9] General drawing of the communication system of the gestalt of the 3rd operation

[Drawing 10] Drawing of the include angle of the video camera 1-12 which is alike and operates to the generate time of a panorama image

[Description of Notations]

1-1 Camera Server Equipment

1-2 Camera Client Equipment

1-3 Network